

STILLMAN (C. F.)

A Practical Splint for Inflammatory
Conditions of Joints.

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REPRINTED FROM AMERICAN LANCET,
MARCH, 1890.



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A PRACTICAL SPLINT FOR INFLAMMATORY CONDITIONS OF JOINTS.

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AT the meeting of the American Medical Association in 1881, the writer presented to the Surgical Section a new joint splint which possessed the following advantages:

1. Extension at any angle with motion.
2. Extension at any angle with fixation.
3. Fixation at any angle.
4. Motion, complete or limited.
5. Exposure of surface about the joint, allowing compression (elastic or otherwise), hot and cold applications, blisters, dressings, without disturbing the action of the apparatus.

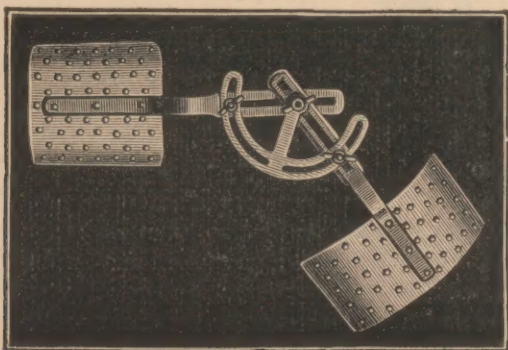


FIG. 1.

Stillman's Sector Bracket.

This splint, to which I gave the name of the sector bracket (see Fig. 1), consists of two terminal plates of



thin copper, perforated upon the upper side, connected with each other by a sector bridge, slightly raised above the plane of the terminal plates. This bridge consists of two over-riding slotted steel strips, connected by three clamps.

This bracket may be most expeditiously secured to a limb with plaster-of-Paris bandage, or a combination of adhesive plaster and plaster-of-Paris, and when dry, the joint can be kept by it under perfect control.

For example, suppose the knee to be the joint for which the sector splint is to be applied. (See Fig. 2).



FIG. 2.

Showing application
of sector bracket to
knee.

The thigh portion of the attachment forms the segment of a hollow inflexible plaster cone which has firmly grasped the muscular structures above the joint, and any extensible force which pushes this segment away from the lower or tibial segment acts in direct antagonism to the inherent strength of the thigh muscles, and stretches the tissues between the attachments, thus causing these tissues to assist in protecting and fixing the joint, because of the rigidity they are made to assume by the stretching process.

In order to successfully produce *local* extension of a joint, the attachment below the articulation should be fixed immovably, and the extension force should be exerted in the axis of the limb, and thus directed against the contractile resistance of the muscular mass governing the joint, until this is overcome and *rest* thereby produced.

The sector joint fulfills these indications perfectly,

and has proved itself since the time of its introduction of especial service in the treatment of various acute inflammatory conditions of the joint. It is also without a rival in the after-treatment of ankylosis and exsections of the joints, owing to the change of angle it permits, while extension is maintained.

It has received warm commendations from many distinguished surgeons, and as the same bracket, or pair of brackets, can be employed for any of the larger joints, it possesses a wide range of usefulness, and can be used over and over again in successive cases, being practically non-destructible.

But in *chronic knee-joint disease*, a plaster-of-Paris dressing is uncomfortable, and cannot be removed without more or less disturbance of the joint—and since the atrophic changes in the muscles render frequent changes of plaster-of-Paris dressings a necessity—the writer has since devised for such cases special forms of apparatus; and the remainder of this paper will be devoted to a description of the form of brace,—see fig. 6,—which I have found most useful in the various *chronic* inflammatory conditions of the knee.

The treatment of diseases of the knee-joint as a class have, from a mechanical standpoint, been impeded by the difficulty in procuring apparatus which could be used advantageously through *all* stages of treatment and in every possible condition which might arise during such treatment, and there has been no one splint which would meet all the different mechanical indications.

One of the most important of these indications is to incorporate in the brace, and to place on either side of the joint (in its transverse pivotal axis), a movement which will allow either fixation or motion. In fig 3 such a one is shown,* and if the pivotal centre is placed in

* For description of this movement, see the *Boston Medical and Surgical Journal*, August 31, 1882, page 200.

the transverse pivotal axis of the joint, its arc of motion will correspond closely to the arc of motion in the normal joint, and by means of the clamp in the slotted arc, the joint may be fixed in any desired position, or by releasing the clamp slightly, motion may be allowed.



FIG. 3.

Stillman's joint movement for fixation or motion.

Another important indication is the occasional employment of traction, and a new feature in this splint consists in the method of obtaining it by having adhesive plaster grasp the knee just below and above the joint over a *very limited* area; and to effect this the plaster is cut in the fan shape, shown in fig. 4 (A), and long strips of webbing are attached to each. It requires four of these fan-shaped pieces for each knee, and four long pieces of webbing, and these are to be placed as shown in fig. 4 (B), interlaced for greater security from displacement, and then covered with roller bandage as in fig. 5. Upon the superior and inferior extremities of the splint are provided rollers and buckles, to which the webbing is to be attached, and then, by means of an elastic ratchet, force may be applied upon the thigh portion of the instrument to effect the extension (see fig. 7).

This arrangement differs from any attachment in ordinary use at the present time, in being limited to a small zone just above and below the joint, and consequently does not interfere with the muscular structure of the thigh or leg, as is the case when the splints are applied by adhesive plaster over the whole extent as in other splints for this purpose, or in the former plaster-of-Paris attachment of the writer.

To exert the traction and produce extension of the

joint, the ends of the webbing strips are to be passed over the rollers at each extremity of the splint, and after being pulled upon as firmly as possible and secured in the buckles provided for that purpose. The upper girth is

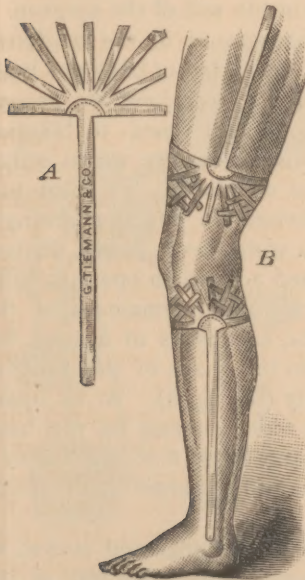


FIG. 4.

(a) Fan shaped pieces of adhesive plaster, with webbing attached, for traction.

(b) The same applied to limb, interlaced.

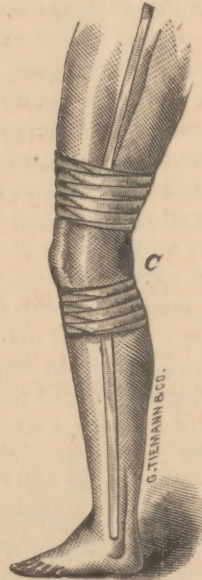


FIG. 5.

(c) The same covered with roller bandage, ready for the splint.

then pushed away from the remainder of the apparatus, either by elastic or rigid ratchets, as the surgeon prefers. The ratchets shown in figs. 6 and 7 consist of two overriding slotted strips, which can be fastened together by a screw clamp when sufficient traction has been ex-

erted by the elastic strap provided for that purpose. This form of ratchet is more effective than any other form of traction ratchet in use, because by simply loosening or tightening the clamp (the elastic strap being on the stretch at the same time), the traction may be varied from the elastic to the fixed at the will of the surgeon.

A point of the utmost importance in the treatment of knee-joint disease, is the prevention of posterior luxation. Most of the diseases of the knee-joint are accompanied by a tendency, even in mild cases, to luxation of the tibia backward, and this is a feature which orthopædic surgeons have tried to overcome. To meet this indication, the writer has devised an effective arrangement which brings to bear a spring lever power, distinct from anything heretofore used and which operates without interfering with the action of the remainder of the brace. It will be noticed that it consists of a long, flat metal bar, bent to conform to the shape of the back of the leg and placed posteriorly (see fig. 6). At its upper end is attached a semi-girth which presses on the back of the upper part of the leg and below it is attached to a stirrup which is itself fastened to the lower girth of the instrument.

This stirrup is provided with a hinge and socket, so that it may be opened and shut when the rest of the brace is in position, and the forward pressure, which is dependent upon the angle which the posterior lever makes with the rest of the brace can thus be adjusted by means of a ratchet at the intersection of the lever with the stirrup, without the necessity of removing the brace from the limb.

One of the features of this arrangement, consists in its adaptability for all classes of cases in which the least tendency to this subluxation exists, for it can be adjusted to any desired angle, thereby giving any degree of for-

ward power, and this power is brought to bear precisely where it is wanted without causing impingement of the brace upon the limb at any point.

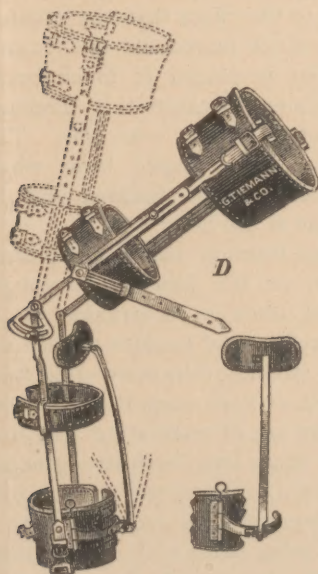


FIG. 6.
Stillman's knee splint.

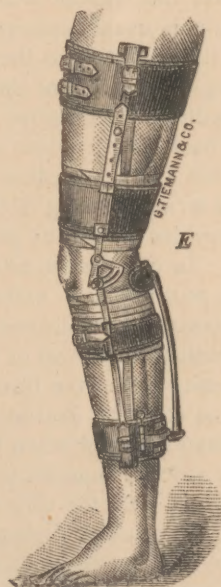


FIG. 7.
Stillman's knee splint applied.

There are very few cases of joint disease, even of the simplest form and the most recent date, in which the comfort of the patient is not increased by having a degree of forward pressure exerted just below the popliteal space.

By means of a ratchet at the intersection of the inferior extremity of the posterior lever and the stirrup to which it is attached, this power, as has been stated, can be adjusted so that the lever can be varied from a

mere upright support to a spring lever of tremendous force, and in every case in which it has been applied (provided of course, that the power exerted is not beyond the amount necessary for the particular case) the patients usual comment is to the effect that the comfort of the apparatus is thereby much increased—and from a surgical standpoint the joint is placed in much better condition for curative treatment, because this tendency to backward luxation is thereby greatly overcome. This is but another application of the V-shaped lever which the writer is using in the treatment of diseases and deformities of various portions of the body.

In conclusion, after the traction has accomplished its purpose, and extension of the joint is no longer necessary, this chronic joint brace is so arranged as to permit the removal of the rollers and buckles at each extremity and of the traction ratchets, thus converting it into an effective fixation brace or knee support during convalescence, and when by the use of restorative measures the anterior muscles of the thigh have been strengthened so as to hold the tibia forward in its normal relation with the femur—the V-shaped lever may be dispensed with—provision for that purpose being made without impairing the efficacy of the rest of the brace. A description of the means to be employed for the restoration of these muscles constitutes too important a subject to be discussed within the limits of this paper and will be reserved for some future occasion; but the neglect of this precaution is not only a fruitful source of the long continuance of lameness after cessation of all actual disease in the joint, but is a cause of relapse, and the importance of muscle restoration is too little insisted upon by ortho-pædic writers when considering the subject of chronic knee-joint disease.

